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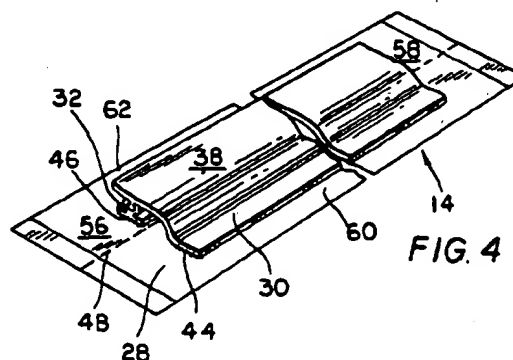
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(54) **Reclosable plastic bags and method of making same utilizing discontinuous zipper strip.**

(57) A reclosable plastic bag is provided with a zipper assembly having zipper strips mounted on a carrier tape. The carrier tape extends beyond the zipper strips and side seals for the bag extend through the sections of the carrier tape which extend beyond the zippers. A method for producing such bags is also disclosed.



**EP 0 528 721 A2**

## Background of the Invention

The present invention relates to improvements in reclosable plastic bags and a method of making the same and more particularly to a method which permits such bags to be formed in situ at a filling machine whereby the bags may be made and simultaneously filled with product.

The art of making reclosable plastic bags provided with mating profiles which form a zipper to render the bags resealable is well defined. Such bags are now readily available both empty for consumer use and as primary packaging for food and numerous other products. Where used as primary packaging, particularly for food items, the bags are usually formed at the filling equipment. This is both for sanitary reasons and to minimize the cost of packaging the food product in such a reclosable bag. U.S. patents 4,709,533 and 4,894,975 typify methods heretofore available for form fill and seal operations and discuss in some detail the construction and art of manufacturing such reclosable plastic bags.

In a typical form, fill and seal operation a film or sheet of plastic material is brought to a filling spout and wrapped into a tube about the filling spout. A zipper strip may be preapplied to the film or applied to the film at the filling machine whereafter a first, downstream cross seam is made in the tube, the tube is filled and the filled section flattened and a second, upstream cross seam is formed thereby completing the package and severing the completed package from the remainder of the tube. The upstream cross seam simultaneously forms the downstream cross seam for the next package and the process is then repeated.

Providing secure cross seams is one of the most critical and most difficult steps in the operation. The reason for this is that the cross seam must extend across the entire transverse direction of the tube to effectively seal the top and bottom sides of the completed package. Heretofore each cross seam had to pass through a section of overlapped film carrying the zipper as well as simple overlapped sections of film. Since the thickness of the zipper is substantially greater than that of the film (usually on the order of 10 times or more thicker) difficulties arise in producing an effective leak free seal in a continuous operation both in the relatively thin main body portions of the bag and the relatively thick zipper portions of the bag without sacrificing production speeds. To overcome such problems resort has heretofore been made to the use of spot sealers and the like to pre-soften or flatten the ends of the zipper in the zones to be sealed. This has led to more expensive equipment as well as reduced production speeds.

## Summary of the Invention

In view of the above it is a principal object of the

present invention to provide a reclosable zipper package having a substantially uniform thickness across its entire width.

A further object is to provide an improved method of forming reclosable plastic packages in which the seals are substantially uniform over their entire length.

A still further object is to provide such a method which can readily be practiced on conventional form, fill and seal equipment with little or no modification to the equipment.

Yet another object is to provide a package having a reclosable zipper which may be discontinuous.

The above and other beneficial objects and advantages are attained in accordance with the present invention by providing a bag body formed of an appropriate plastic material and having opposed side walls joined at top, bottom and side edges. A zipper assembly extends down the bag from top to bottom or side to side. That is, the zipper may be applied either in the machine direction or cross seam direction. The zipper assembly comprises a pair of coextensive, elongated plastic zipper strips permanently bonded to a carrier tape. Each of the zipper strips has a profile complementary to and adapted to interlock with the profile of the other zipper strip. The carrier tape extends beyond the zipper strips in both the longitudinal and transverse directions so as to define a border surrounding the zipper strips. The zipper assembly is mounted to a side wall of the bag body with only the end sections of the border extending to the edges of the bag body so that any side seal passes only through the border and not the zipper strip.

A method is provided for forming such packages in situ at a form, fill and seal machine by continuously feeding a film of plastic material and forming it into a tube about a filling spout of the machine. A zipper assembly having first and second interlocking members on zipper strips discretely spaced along a carrier tape is fed parallel to the tube and attached to the film. A downstream cross seam is formed in the tube through the carrier tape between adjacent discrete sections of zipper, the tube is filled and the upstream cross seam is formed through the carrier tape between the next sections of zipper which also forms the downstream cross seam for the next package and the operation is repeated.

## Brief description of the drawings

In the accompanying drawings:

Fig. 1 is a perspective view of a reclosable package in accordance with the present invention;

Fig. 2 is an enlarged sectional view of the package of Fig. 1 taken along reference lines 2-2 in the direction indicated by the arrows;

Fig. 3 is an enlarged sectional view of the zipper portion of the package of Fig. 1 with the zipper

open;

Fig. 4 is a fragmentary enlarged view of the zipper assembly used in the package of Fig. 1.

Fig. 5 is a fragmentary view similar to Fig. 2 wherein the zipper is disposed on an interior surface of the package wall;

Fig. 6 is a view similar to Fig. 5 depicting an alternative zipper construction embodying a tear strip;

Fig. 7 is a view similar to Fig. 6 after the tear strip is removed;

Fig. 8 is a view similar to Fig. 2 wherein the free edges of the zipper strips are joined together with a tear bead;

Fig. 9 is a simplified perspective view of a form fill and seal machine upon which packages in accordance with the present invention may be produced with the zipper running in the machine direction; and,

Fig. 10 is a simplified top plan view of the section of the machine depicted in Fig. 9 whereon the tear is attached to the zipper strips and bag body.

#### Detailed description of the Preferred Embodiments

Reference is now made to the drawings and to Fig. 1 in particular wherein a package 10 is depicted comprising a bag body 12 which may be formed in single or multiple layers provided with a sliderless zipper 14. The bag body 12 includes opposed side walls 16, 18 joined at bottom edge 20, top edge 22, and side edges 24, 26. The top and bottom edges are formed by folds in the plastic material from which the bag is made while the side edges are defined by seals extending across the bag from top to bottom.

Referring to Figs 2-4 it can be seen that the zipper 14 is formed of a relatively thin carrier tape 28 to which zipper strips 30, 32 are permanently attached. Each of the zipper strips 30, 32 includes an elongated profile 34, 36 which is coextensive with the strip. The profiles are contoured to enable them to interengage with each other in a well known fashion. A flange 38 is provided on one of the zipper strips 30 to facilitate disengaging the profiles to open the package 10 when closed with the zipper 14. Each of the zipper strips 30, 32 has a margin 40, 42 adjacent to its profile and the zipper strips are bonded to the carrier tape 28 in bonding areas 44, 46 disposed within the margin. To this end the carrier tape and zipper strips may each be formed of a fusible plastic material, such as polyethylene, thereby enabling the zipper strips 30, 32 to be heat sealed to the carrier tape 28. If the zipper strips or carrier tape are not formed of a fusible material they may be bonded to one another using a suitable adhesive having sufficient gripping force to withstand the force needed to disengage the profiles to open the package.

As shown in Fig. 2, the bonding areas 44 and 46

are spaced apart from each other and the carrier tape between the bonding areas is provided with a preweakened zone 48 defined by a line of perforations, a partial score line or the like. It may also be noted from Fig. 2 that the preweakened zone 48 is off center between the bonding areas 44, 46 dividing the carrier tape into longitudinal sections 52, 54 with substantially more of the carrier tape material on the side of the preweakened zone 48 adjacent bonding area 44. As a result, when the carrier tape is ruptured along the preweakened zone and the zipper profiles separated, the longitudinal carrier tape section 52 overlies the profile 34 as shown highly exaggerated in Fig. 3. This provides a convenient pour flap through which the contents of the package may be poured after the bag side wall 50 below the zipper assembly is ruptured.

An important feature of the present invention derives from the fact that the carrier tape defines a border extending completely about the zipper strips. That is, the border includes end sections 56, 58 as well as longitudinal side sections 60, 62. The end sections of the border 56, 58 extend to the side edges 24, 26 of the bag body so that the side seams for the final package need only pass through the carrier tape and not through the zipper profiles. Since the thickness of the carrier tape is nominal (in the order of 1-5 mils) as compared with the thickness of the zipper profile (on the order of 60 mils or more) no special pre or post treatment of the zipper assembly at the side seals is necessary. That is, no ultrasonic spot seal, flattening of the carrier tape or the like is required in order to insure a proper seal. This is extremely important where the package 10 is to be formed on form, fill and seal equipment since no major modification of the equipment is required to accommodate the film from which the package is to be formed notwithstanding the fact that it contains a zipper. In addition, the zipper may be discontinuous and extend across only a portion of the package (rather than from side to side or top to bottom) by making the end sections 56, 58 wide enough. This is extremely useful in controlling the flow of powder or granular material from the package. Thus, the size of the zippered opening may be tailored to the product to be packaged.

In Fig. 5 a modification of the package of the present invention is depicted in that the zipper assembly 14 is provided on the inside of the package 64 as distinct from the package 10 depicted in Figs. 1 and 2 wherein the zipper is on the outside. In this case the bag body must be cut in the area 66 overlying the zipper in order to gain access to the zipper 14. It should be noted, however, that whether the zipper assembly is inside or outside the bag the integrity of the package does not rely on the zipper assembly in any way but rather relies only on the bag body. Thus the zipper assembly need not have any particular barrier properties since access to the product within the package is gained only after the initial rupture of

the bag wall. Thus shelf life for the package is dependent only on the properties of the material from which the bag body is formed and the zipper only aids in enhancing household storage after the package has been opened.

To render the package more vandal proof, the free edges of the zipper strip may be joined together at a tear bead as shown in Fig. 8. The bead 68 may be conveniently formed of a denser plastic having a higher tensile strength than the zipper strips. For example, where the zipper strips are formed of polyethylene the tear bead may be formed of polypropylene. As shown in Fig. 6, where the zipper assembly is affixed to an internal surface of the bag body, the tear bead 68 may be fused to the bag body as well as the zipper strips thereby facilitating the rupturing of the bag body to gain access to the zipper. After the bag depicted in Fig. 6 has been opened the preweakened zone 48 of the carrier tape must be ruptured before the contents of the bag are accessible as shown in Fig. 7.

Reference is now made to Fig. 9 wherein a form fill and seal machine 70 is depicted wherein a package 10 as described above may be formed as a product is filled into the package through a filling spout 72. Thus, a film 74 having a desired barrier properties for the product to be filled in the package is brought to the filling spout 72 and formed into a tube about the spout by joining the edges 76,78 of the film together and sealing them with sealing bar 80. A zipper tape 82 which comprises carrier tape 28 containing discrete lengths of zipper 14 bonded thereto is fed past appropriate guide rollers 84 to abut the tube 79 and the longitudinal borders 52,54 of the carrier tape are heat sealed to the tube with sealing bars 86,88. As shown in Fig. 9, the zipper tape 82 is brought to the outside of the tube to form a package as shown in Fig. 2. By bringing the zipper to the inside of the tube a package such as that depicted in Fig. 5 may be formed. The zipper tape 82 may be formed as disclosed in, my commonly assigned U.S. Patent 5,024,537 which issued on June 18, 1991 for TAPE CARRIED PRE-CUT ZIPPER.

After the zipper tape is attached to the tube a downstream cross seam is formed across the tube by sealing bars 90,92 sealing the bottom of the tube. The tube is then filled with product against the downstream seam as it continues to move downward. Thereafter an upstream cross seam 26 is formed completing and separating the filled package 10 and forming the downstream seam for the next package. In accordance with the present invention, the cross seams are formed only in the blank sections of carrier tape 94 between adjacent discrete sections of zipper 96 on the carrier tape. Accordingly, the sealing bars 90,92 are not confronted with the relatively large mass of plastic at the zipper but only the nominal additional mass of the carrier tape.

In the event the zipper 14 is provided with a tear bead as shown in Fig. 10 which is to be joined to the tube to facilitate opening as shown in Fig. 6, a hot pinch jaw 98,100 is provided downstream of the sealing bars 86,88 to fuse the tear bead 68 to the adjacent section of tube 100 as it passes.

Thus, in accordance with the above the aforementioned objects and advantages are effectively attained.

## Claims

1. A reclosable package comprising;
  - a bag body formed of plastic and including opposed sidewalls joined at top, bottom and opposed side edges; and,
  - a zipper assembly attached to one of said sidewalls, said assembly comprising: a pair of substantially coextensive elongated plastic zipper strips having complimentary interlocking elongated profiles; an elongated carrier tape; means permanently bonding each of said zipper strips to said carrier tape; said carrier tape extending longitudinally beyond the zipper strips whereby to define border end sections adjacent both opposite ends of said zipper strip.
2. The reclosable package in accordance with claim 1, wherein said bag body has seams at said opposed side edges with said seam extending through said border end sections.
3. The package in accordance with claim 2, wherein said zipper strips are spaced apart on said carrier tape whereby to define an elongated space therebetween and said carrier tape includes a preweakened zone within said elongated space.
4. The package in accordance with claim 2, wherein said bag body and said carrier tape are formed of fusible material and said zipper assembly is attached to said bag body by heat seals of said carrier tape to said bag body.
5. The package in accordance with claim 2, wherein each of said zipper strips includes an elongated margin adjacent to its associated profile and said zipper strips are bonded to said carrier tape along longitudinally extending bonding areas in said margins.
6. The package in accordance with claim 5, wherein said preweakened zone is off-center with respect to the spacing between the bonding areas of said zipper strip margins.
7. The package in accordance with claim 5, wherein

- the transverse distance along said carrier tape from one of said zipper strips to said preweakened zone is greater than the distance from the bonding area for said one zipper strip to the profile of said one zipper strip. 5
8. The package in accordance with claim 2, wherein said zipper assembly is attached to an interior surface of one of said bag body sidewalls. 10
9. The package in accordance with claim 2, wherein said zipper assembly is attached to an exterior surface of one of said bag sidewalls. 15
10. The package in accordance with claim 3, wherein said preweakened zone comprises a line of perforations. 20
11. The package in accordance with claim 5, wherein said zipper strips are joined to one another along a joining edge opposite to said elongated margin. 25
12. The package in accordance with claim 11, further including a tear bead disposed along said joining edge and fused thereto, said tear bead being formed of a plastic material having different characteristics from the plastic material of said zipper strips. 30
13. The package in accordance with claim 12, wherein said zipper assembly is attached to an interior surface of one of said sidewalls and said tear bead is further bonded to said package sidewall. 35
14. A method of forming reclosable package comprising the steps of: 40  
     forming a tube of plastic film material;  
     feeding a zipper assembly into a position adjacent said tube, said assembly having coextensive first and second zipper strips with complementary profiles thereon discretely spaced along a carrier tape, said carrier tape including blank sections disposed between adjacent sections of zipper strip;  
     bonding said zipper assembly to said tube; 45  
     and,  
     forming seams in said tube which extend through said zipper assembly only through said carrier tape blank sections. 50
15. The method in accordance with claim 14, wherein said zipper assembly is fed to an interior surface of said tube. 55
16. The method in accordance with claim 13, wherein said zipper assembly is fed to an exterior surface of said tube.
17. The method in accordance with claim 15, wherein said profiles are joined by a tear bead and further comprising the step of joining said tear bead to said tube.
18. The method in accordance with claim 14, wherein said tube is formed about a filling spout of a form fill and seal machine.

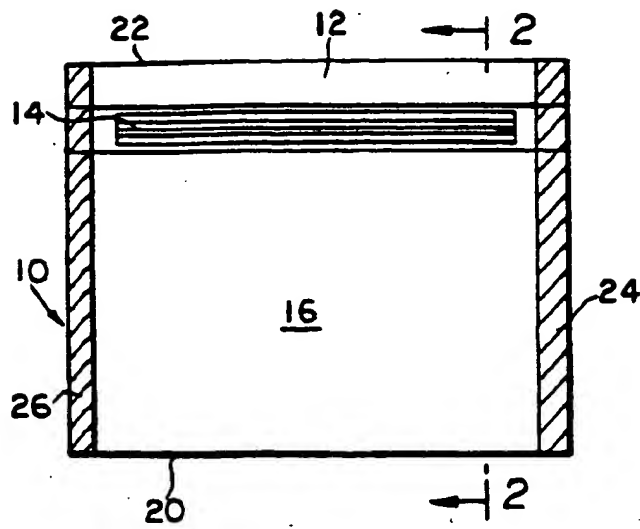


FIG. 1

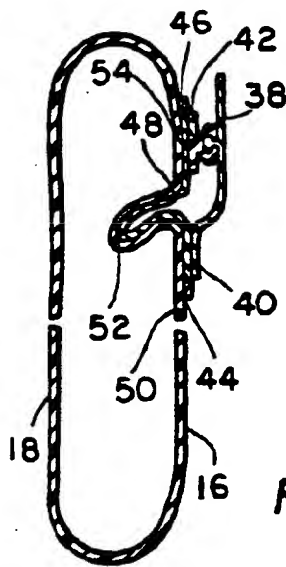


FIG. 2

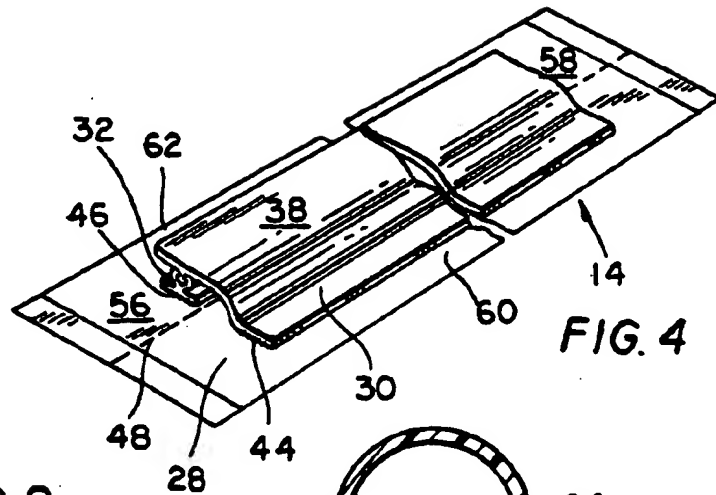


FIG. 4

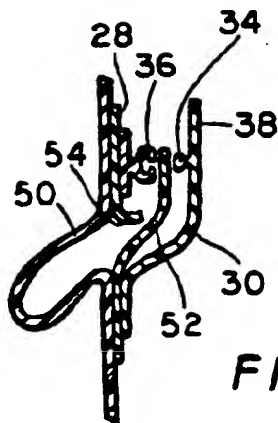


FIG. 3

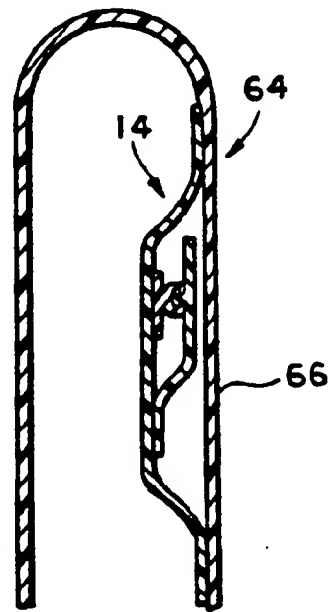


FIG. 5

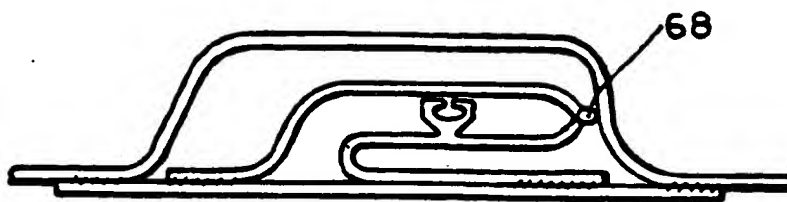
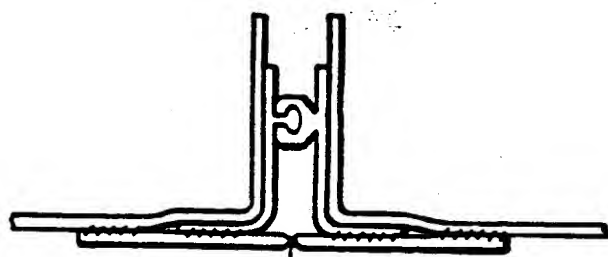


FIG. 6



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FIG. 7

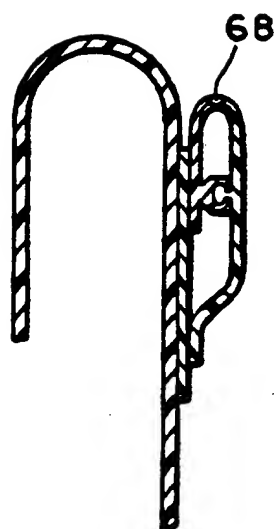


FIG. 8



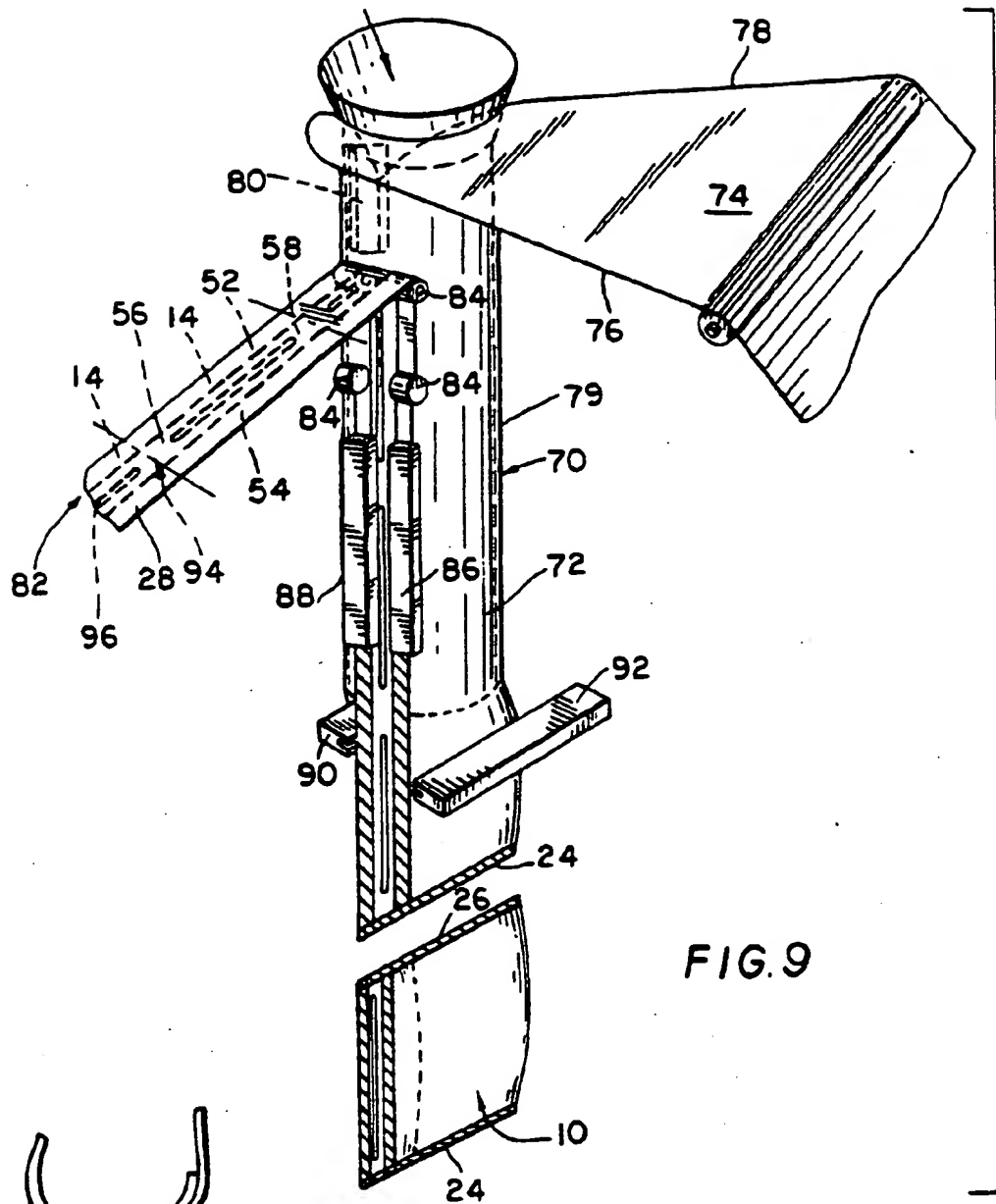


FIG. 9

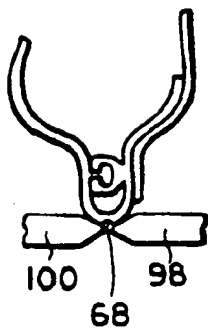


FIG. 10